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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

IN RE APPLICATION OF: Dick Lee Knox	§	DOCKET NO.: 104-22663
SERIAL NO.: 09/656,683	§	EXAMINER: Dang D. Le
FILED: September 7, 2000	§	
FOR: Motor Bearing for Submersible Motors	§	GROUP ART UNIT: 2834

APPEAL BRIEF

This is an appeal from the final rejection of claims 1 through 14 in the above referenced patent application. The final action is dated March 28, 2002.

APPELLANT'S BRIEF (37 C.F.R. § 1.192)

I. REAL PARTY IN INTEREST

Dick Lee Knox, 14303 E. Dogwood Lane, Claremore, OK 74017, and Baker Hughes Incorporated, P.O. Box 4740, Houston, TX 77210 are the real parties in interest of the captioned patent application.

CERTIFICATE OF MAILING
37 CFR § 1.8(a)

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope on the date indicated below and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231

By: James E. Bradley Date: July 29, 2002

II. RELATED APPEALS AND INTERFERENCES

None.

III. STATUS OF CLAIMS

A. Total Number of Claims in Application

Fourteen (14) claims were originally filed in this application.

B. Status of All the Claims

1. Claims canceled: None.
2. Claims withdrawn from consideration but not canceled: None.
3. Claims pending: None
4. Claims allowed: None
5. Claims rejected: Claims 1 through 14

C. Claims on Appeal

Claims 1 through 14

IV. STATUS OF AMENDMENTS

Claims 1 through 14 were finally rejected in an office action dated March 28, 2002. The amendment to claim 6 was entered.

V. SUMMARY OF INVENTION

The present invention involves a coiled member placed in a cavity formed in the outside diameter of the bearing body. The purpose is to maintain contact between the bearing body and the stator inner wall, which prevents rotation of the bearing body and stabilizes the shaft. In the preferred embodiment, the coiled member is metallic. This broadens the operating uses of the bearing member since the bearing member will not be restricted by variability and temperature limitations of other materials, nor by the swelling limitations due to submergence in oil. The coiled member may be comprised of a continuous coiled member, connected end-to-end to form a single ring. Alternatively, the coiled member may be comprised of more than one coiled member segment. These multiple coiled member segments can be connected end-to-end with straight wire sections between them to form a single ring that sits in the cavity encircling the entire bearing body.

VI. ISSUE

1. Whether claims 1-3, 5-9, and 11-13 are unpatentable under 35 U.S.C. § 103(a), over Beavers *et al.* in view of Balsells and Nogle.

2. Whether claims 4, 10, and 14 are unpatentable over Beavers *et al.* in view of Balsells and further in view of Ide and Nogle.

VII. GROUPING OF CLAIMS

Claims 1 through 3, 5-9, and 11-13 are grouped with respect to issue 1 set out above. It is suggested that the Board choose claim 1 as representative of this group.

Claims 4,10, and 14 are grouped with respect to issue 2. It is suggested that the Board choose claim 4 as representative of this group.

VIII. ARGUMENT

The Examiner has rejected all of the claims 1 through 14 under 35 U.S.C. § 103 as being unpatentable for obviousness. The Examiner contends that a person skilled in the art of submersible motors would be able to take the teachings from the prior art and combine the disclosures to invent the proposed patent. To support his argument, the Examiner cites four different patents in different combinations: 1) Beavers *et al.*, 2) Balsells, 3) Nogle, and 4) Ide. The Examiner believes that it is proper to combine the teachings in these four patents, however this is not the case. None of the four patents motivates an individual skilled in the art of submersible pump electric motors to place a coiled spring between a bearing member and an outer member to prevent rotation of the bearing member.

The Applicant respectfully disagrees with the Examiner's conclusion. Concerning the first issue, claim 1 claims "... a *coiled* member contained in the cavity, having an outer portion that frictionally engages an inner wall of the stator, *preventing rotation of the bearing body and stabilizing the shaft*" (emphasis added). Note that the claim also requires that the body receive a rotatable shaft and be located within a stator.

The Examiner rejects claims 1, 3, 6, and 7 for obviousness over Beavers *et al.* in view of Balsells. Beavers *et al.* discloses an elongated wavy spring in a submersible pump motor to prevent rotation of the bearing body. Beavers *et al.* thus discloses an elongated wavy spring and not a coiled member as claimed as the way to prevent the rotation of the bearing body.

The Examiner considers it obvious to one of average skill in the art to utilize a coiled spring instead of the wavy spring in Beavers *et al.* in view of Balsells. Balsells discloses a coiled spring, but it does not frictionally engage an outer portion to prevent rotation of an inner member. The coiled spring of Balsells has nothing to do with preventing rotation. The spring of Balsells is used to reduce wear on the shaft of an axially reciprocating shaft by providing a space between the outer housing and the shaft, but does not provide for the anti-rotational component

as found in the Applicant's invention. Neither the shaft nor the outer housing rotate relative to each other in Balsells.

The Applicant submits there is no suggestion of combing the references. Once skilled in the art reviewing Beavers *et al.* would not look to the coiled spring of Balsells to prevent the rotation of a bearing body in a submersible motor, because the coiled spring of Balsells does not prevent rotation. The outer housing of Balsells would not rotate even if the coiled spring were omitted. There is no showing in Balsells that the hoop strength of the coiled spring would be high enough to prevent rotation of the bearing body. There is no motivation that it would be feasible to use the coiled spring of Balsells in place of the corrugated spring of Beavers *et al.* The Applicant submits that it would not be obvious to do so under § 103.

Nogle also does not deal with a submersible motor, but a high-speed rotatable shaft with springs that allow it to float radially in the housing, reducing the wear on the shaft. Nogle's coiled spring is used in conjunction with minimizing the transmission of radial forces and rotor frequency noise resulting from misalignment or eccentricity of the shaft. However, the springs of Nogle do not prevent rotation between inner and outer components. Springs 30 and 34 are located between two sleeves 13 and 14. Sleeves 13 and 14 do not rotate relative to one another and are stationary along with bushing 12. Inner sleeve 13 is prevented from rotating by a tubular latch 25 that fits into holes 23 and 24 in sleeves 13 and 14. Latch 25 extends radially and is urged against housing 11 by a spring 26. Spring 26 and latch 25 lock housing sleeve 14 with sleeve 13 and prevent rotation relative to housing 11.

Nogel, similar to Balsells, does not suggest a coiled spring surrounding a bearing will serve as an anti-rotational element. Even if springs 30 and 34 are omitted, sleeves 13 and 14 would not rotate. The Applicant's concept of using a circumferentially coiled spring to stop rotation in a submersible motor bearing member is not suggested by extending either reference. The Applicant submits that one skilled in the art would not learn from Nogle that a coiled spring could be used to prevent rotation in lieu of the wavy spring of Beavers *et al.* The coiled springs of Balsells and Nogle serve only to allow radial movement of the support, not to prevent the rotation of the support.

In response to the second issue, claim 4 requires that the coiled member comprise a plurality of coiled member segments that are spaced apart from each other around the outer periphery of the bearing body as shown in Figure 4. The Examiner cited Ide for the purpose of

§ 103. Ide deals with longitudinal expansion as the pump motor temperature increases. This expansion causes longitudinal movement of the rotor relative to the stator. Ide teaches rotatable wheels 37 at the periphery of the bearing member 31 to facilitate the longitudinal movement. There is no suggestion to substitute for the wheels coiled spring segments circumferentially spaced apart form each other. No coiled springs, segments, or otherwise are shown. A rotatable wheel is considerably different from a coiled spring. The coil spring relies on hoop strength in order to prevent rotation. The rotatable wheels rely on frictional engagement, apparently due to their resilience. The specification teaches an elastic material such as a polymer or rubber as a material for the wheels (Col. 5, lines 42-45). Also, the Applicant's invention is not used to aid longitudinal expansion nor does Ide suggest that replacing the wheels with coiled spring segments would allow similar thermal growth.

The teachings of the above patents do not motivate one skilled in the art to combine Beavers *et al.* with any of the patents. The teachings in Balsells and Nogle are to use a coiled spring for radial compliant support between two members that do not rotate relative to one another. These disclosure do not suggest coiled springs could stop the rotation of a bearing body and another member. Nor do the teachings of Beavers *et al.*, Balsells, or Nogle and Ide motivate an individual to use coiled spring segments in replacement for the corrugated wavy spring of Beavers *et al.* For the foregoing reasons, it is submitted that the Examiner's rejections of claims 1 through 14 are erroneous and a reversal of his decision is respectfully requested.

IX. APPENDIX

Appendix 1 provides a copy of the claims presented in this appeal.

X. CONCLUSION

For the foregoing reasons, it is submitted that the Examiner's rejections of claims 1 through 14 are erroneous, and reversal of his decision is respectfully requested.

Please charge the filing fee of $320 to Deposit Account No. 02-0429 Baker Hughes, Inc.

Respectfully submitted,

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DATE: July 29, 2002

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APPENDIX 1

1. In an elongated electric motor for a submersible pump having a cylindrical housing, a stator mounted in the housing for producing a magnetic field when supplied with electrical power, a rotatable shaft installed within the stator, a rotor comprised of spaced apart rotor sections mounted to the shaft, an improved bearing assembly mounted between two of the adjacent rotor sections for supporting the shaft, comprising in combination:

a stationary bearing body that rotatably receives the shaft, the bearing body having a cylindrical outer periphery with a cavity extending to the outer periphery of the bearing body; and

a coiled member contained in the cavity, having an outer portion that frictionally engages an inner wall of the stator, preventing rotation of the bearing body and stabilizing the shaft.

2. The motor according to claim 1, wherein the coiled member is made of a metallic material.

3. The motor according to claim 1, wherein the coiled member is a continuous coiled element extending entirely around the outer periphery of the bearing body.

4. The motor according to claim 1, wherein the coiled member comprises a plurality of coiled member segments that are spaced apart from each other around the outer periphery of the bearing body.

5. The motor according to claim 1, wherein the coiled member is circular in cross-section and has a cross-sectional diameter greater than a radial depth of the cavity.

6. The motor according to claim 1, wherein the cavity extends circumferentially along the outer periphery of the bearing body, and the coiled member has a centerline that extends circumferentially around the bearing body.

7. The motor according to claim 1, wherein the coiled member has a radial dimension from an inner portion to the outer portion that is greater than a radial dimension from a base of the cavity to the inner wall of the stator while the coiled member is in an undeflected state.

8. An elongated electric motor, comprising in combination:

a cylindrical housing;

a stator mounted in the housing for producing a rotating field when supplied with electrical power;

a rotatable shaft installed within the stator;

a rotor comprised of spaced-apart rotor sections mounted on the shaft;

a stationary bearing body that rotatably receives the shaft and is located between two of the rotor sections, the bearing body having a cylindrical outer periphery provided with a cavity extending circumferentially along the outer periphery of the bearing body; and

a metallic coiled member contained in the cavity, the coiled member being circular in cross-section with a cross-sectional diameter greater than a radial depth of the cavity, with an outer portion that extends circumferentially along the outer periphery of the bearing body and frictionally engages an inner wall of the stator, preventing rotation of the bearing body and stabilizing the shaft.

9. The motor according to claim 8, wherein the coiled member is a continuous coiled element extending entirely around the outer periphery of the bearing body.

10. The motor according to claim 8, wherein the coiled member comprises a plurality of coiled member segments that are spaced apart from each other around the outer periphery of the bearing body.

11. The motor according to claim 8, wherein the cross-sectional diameter of the coiled member while undeflected is greater than the radial dimension from a base of the cavity to the stator inner wall.

12. An improved bearing assembly for mounting between adjacent rotor sections of an elongated electric motor having a stator, a rotatable shaft installed within the stator, and a rotor comprised of spaced apart rotor sections mounted to the shaft, the bearing assembly comprising in combination:

a stationary bearing body adapted to rotatably receive the shaft, the bearing body having a cylindrical outer periphery with a circumferentially extending cavity therein, the cavity having an outward facing base; and

a metallic coiled member contained in the cavity, the coiled member having a circular cross-section with a cross-sectional diameter greater than a radial dimension of the cavity, having an inner portion in contact with the base and an outer portion protruding past the outer periphery for contact with the stator.

13. The bearing assembly according to claim 12, wherein the coiled member is a continuous coiled element extending entirely around the outer periphery of the bearing body.

14. The bearing assembly according to claim 12, wherein the coiled member comprises a plurality of coiled member segments that are spaced apart from each other around the outer periphery of the bearing body.